Non-Financial Policy Instruments

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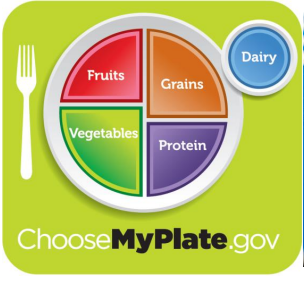
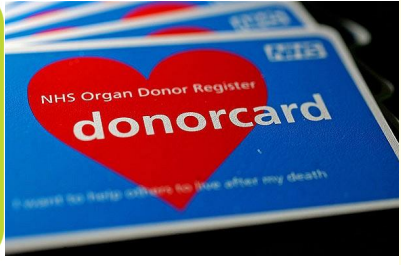
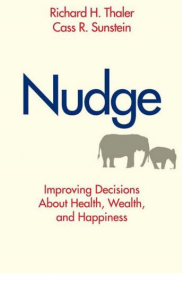
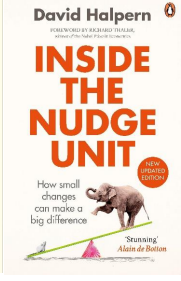
May 2, 2022

Non-financial policy instruments (NPIs)









NPIs

- What people seem to mean by “nudges”: policy instruments designed to affect choice without affecting opportunities
  - Will argue that few levers plausibly satisfy this definition, thus NPI is a more useful term
- Examples: information provision, social comparisons, reminders, framing, defaults, commitment opportunities, advertising, ...
- “Libertarian paternalism” (Thaler and Sunstein 2003), “asymmetric paternalism” (Camerer et al. 2003)
- Increasingly used to encourage privately or socially beneficial behaviors:
  - Retirement savings, smoking cessation, environmental conservation, charitable giving, healthful eating, exercise, organ donation, ...
  - Government “nudge units” (UK, US, DC, Australia, ...)

The economic approach to NPIs

With our PF hats on:

Recall that the welfare effect of a tax reform is

$$\frac{dW_\theta}{dt} = \underbrace{-\gamma_\theta(t)\frac{dx_\theta}{dt}}_{\text{Bias correction}} + \underbrace{t\frac{dx_\theta}{dt}}_{\text{Fiscal externality}} + \underbrace{x_\theta(1-g_\theta)}_{\text{Mechanical effect}}$$

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Generalization to arbitrary intervention of "size" σ

$$\frac{dW_\theta}{d\sigma} = \underbrace{-\gamma_\theta(\sigma)\frac{dx_\theta}{d\sigma}}_{\text{Bias correction}} + \underbrace{\left(t + \frac{\partial R}{\partial x}\right)\frac{dx_\theta}{d\sigma}}_{\text{Fiscal externality}} + \underbrace{\frac{\partial R}{\partial \sigma} - a'_\theta(\sigma)g_\theta}_{\text{Mechanical effect}}$$

R: Government revenue given σ, a_θ: aversiveness of intervention, g_θ : welfare weight

Key economic quantities:

- Covariance of treatment effects and bias
- Consumers' aversiveness to (or enjoyment from) intervention
- Fiscal externalities and costs of implementation

More specified set-up

Set up:

- Consumers have unit demand for a good x, and derive utility v_θ from x
- Bias γ_θ and treatment effects of NPI given by τ_θ
- Purchase the good if $v_\theta + \gamma_\theta + \tau_\theta \geq p$ and derive utility $v - p$ from the purchase
- Producers have cost function $c(q)$ to produce q units of good x, where $c'(q)$ is assumed positive and $c''(q)$ is assumed weakly positive
- Ignore redistributive concerns, for simplicity

Welfare effects of NPIs in this set-up (Allcott, Morrison, Taubinsky 2022)

Intervention with treatment effects τ_θ, s.t. consumers purchase iff $v_\theta + \gamma_\theta + \tau_\theta \geq p$

$$\text{No tax case: } \Delta W \approx \frac{1}{2}\left(\mathbb{E}\left[(\gamma_\theta + \tau_\theta)^2 | p\right] - \mathbb{E}[\gamma^2 | p]\right) D'_p - \mathbb{E}[a_\theta]$$

$$\text{W/ optimal sin tax: } \Delta W \approx \frac{1}{2}\left(Var\left[(\gamma_\theta + \tau_\theta) | p, \sigma\right] - Var[\gamma | p, \sigma]\right) D_p - \mathbb{E}[a_\theta]$$

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$\Rightarrow$ "Good" behavior change is not about $\mathbb{E}[\tau_\theta]$; it's about decreasing...

1. ...the *second* moment of "post-intervention bias," $\gamma_\theta + \tau_\theta$
   - W/ optimal sin tax, $\mathbb{E}[\tau_\theta]$ is completely unrelated to ΔW
2. ...aversiveness of the intervention, $\mathbb{E}[a_\theta]$

Example 1

- Consumers purchasing sugary drinks either have
  - $\gamma_\theta >> 0$ (oblivious about health costs)
  - $\gamma_\theta \lessapprox 0$ (obsessive healthy eaters)
- Treatment effects of sugar warning label:
  - $\tau_\theta = 0$ when $\gamma_\theta >> 0$ (oblivious people ignore)
  - $\tau_\theta > 0$ when $\gamma_\theta \leq 0$ (healthy eaters are highly sensitized)

$\Rightarrow$ Label decreases welfare, despite decreasing sugary drinks consumption

Example 2

- Homogeneous bias $\gamma_\theta \equiv \gamma$
- Intervention makes $\gamma_\theta = 0$ for 50% of consumers
  - Unambiguous improvement in “decision quality”
- With optimally set taxes, this intervention is welfare-decreasing

Example 2

- Homogeneous bias $\gamma_\theta \equiv \gamma$
- Intervention makes $\gamma_\theta = 0$ for 50% of consumers
  - Unambiguous improvement in "decision quality"
- With optimally set taxes, this intervention is welfare-decreasing
  - Pre-intervention, tax $t = \gamma$ achieves the first best
  - Post intervention, no tax can achieve the first best because of heterogeneity

Example 3

- $\tau_\theta = \gamma_\theta + \varepsilon$, where $\mathbb{E}[\varepsilon] = 0$
  - So the intervention is well-targeted in an “average” sense

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- $\tau_\theta = \gamma_\theta + \varepsilon$, where $\mathbb{E}[\varepsilon] = 0$
  - So the intervention is well-targeted in an “average” sense
- Intervention is welfare-decreasing (with and without taxes) when $Var[\varepsilon]$ is sufficiently high
  - Intuition: Intervention generates more “noise” in people’s decisions than the pre-existing biases did

Generalization: Incomplete pass-through

Imperfectly competitive markets with elastic supply

- Pass-through of producer taxes to prices, ρ, is key additional stat
- Impact of NPI on prices is $\approx \mathbb{E}[\tau_\theta](1-\rho)D'_p$

I. Without taxation:

$$\Delta W \approx \frac{1}{2}\rho\left(\mathbb{E}[(\tau_\theta+\gamma_\theta)^2|p]-\mathbb{E}[\gamma_\theta^2|p]\right)D'_p+(1-\rho)\frac{1}{2}\left(Var[\tau_\theta+\gamma_\theta|p]-Var[\gamma_\theta|p]\right)\cdot D'_p-\mathbb{E}[a_\theta]$$

II. With taxation (set by the social planner):

$$\Delta W \approx \frac{1}{2}\left(Var[\tau_\theta+\gamma_\theta|p]-Var[\gamma_\theta|p]\right)\cdot D'_p-\mathbb{E}[a_\theta]$$

Example 4

- Fixed supply of the good, so $\rho = 0$
- Homogeneous bias $\gamma_\theta \equiv \gamma$
- Intervention makes $\gamma_\theta = 0$ for some of the consumers
  - Unambiguous improvement in "decision quality"
- With and without taxes, this intervention is welfare-decreasing

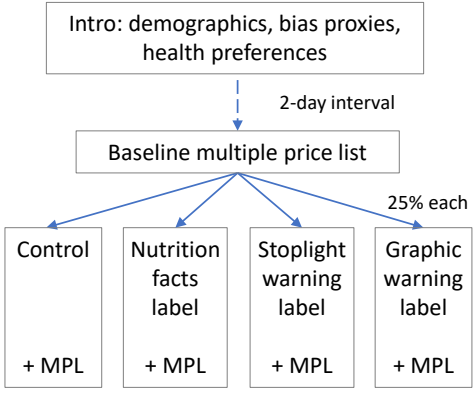
Example 4

- Fixed supply of the good, so $\rho = 0$
- Homogeneous bias $\gamma_\theta \equiv \gamma$
- Intervention makes $\gamma_\theta = 0$ for some of the consumers
  - Unambiguous improvement in "decision quality"
- With and without taxes, this intervention is welfare-decreasing
  - Pre-intervention, we have first-best allocation
    - allocation is invariant in the degree of homogeneous bias
  - Post intervention, we have inefficiencies due to heterogeneity in bias

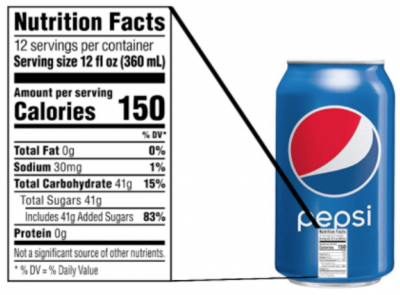
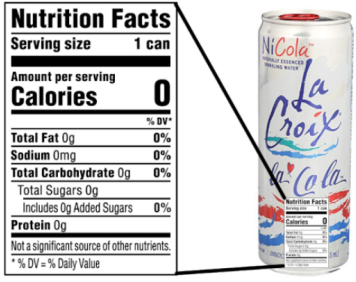
Measuring targeting

Allcott, Morrison, and Taubinsky (2022): Measuring targeting

- Measure targeting of fuel economy and health information provision
- Welfare analysis given covariances
- Proxy for bias with nutrition knowledge and self-control questions



Nutrition label treatment

Pepsi 12-pack, 12 fl. oz. per can	LaCroix Cola 12-pack, 12 fl. oz. per can
	
Click here to see nutrition facts.	Click here to see nutrition facts.

In each row of the table below, please tell us whether you would purchase the 12-pack of Pepsi or the 12-pack of LaCroix Cola at each of the price points below:

Pepsi for $1.00	○ ○	LaCroix Cola for $4.00
Pepsi for $1.50	○ ○	LaCroix Cola for $4.00
Pepsi for $2.00	○ ○	LaCroix Cola for $4.00
Pepsi for $2.50	○ ○	LaCroix Cola for $4.00

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Pepsi for $2.00	○ ○	LaCroix Cola for $4.00
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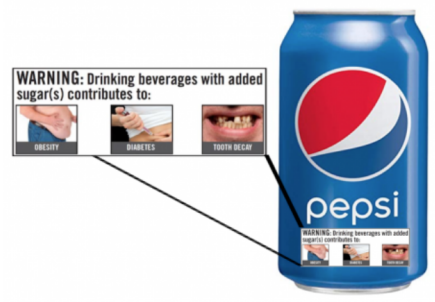	
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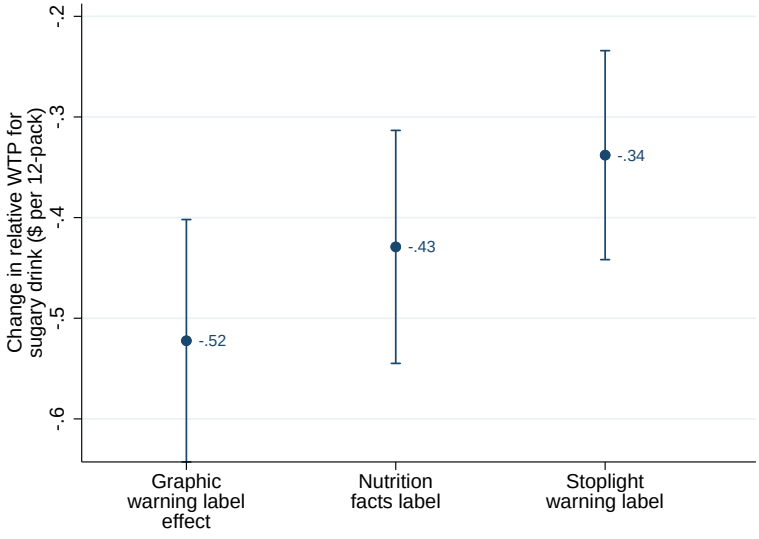
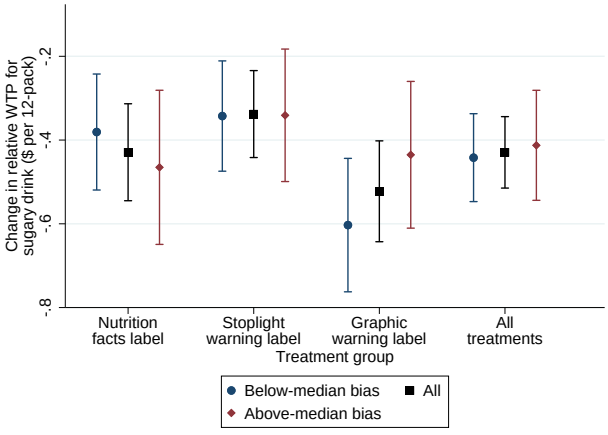
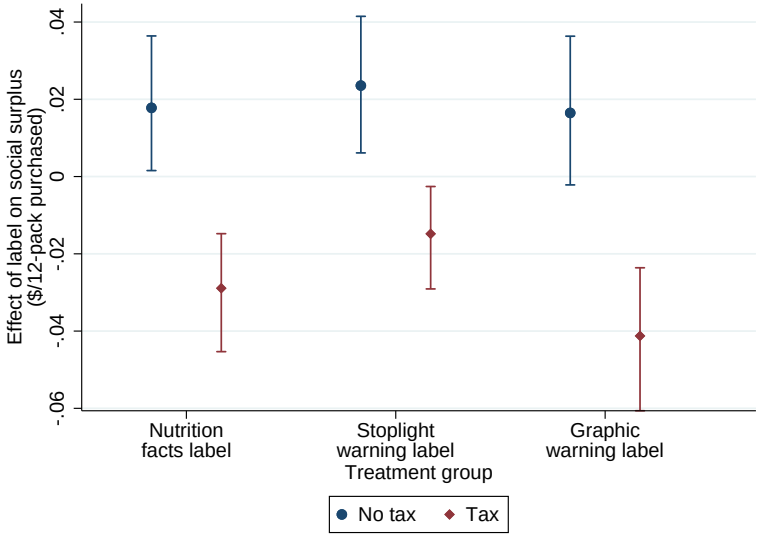
Labels change behavior



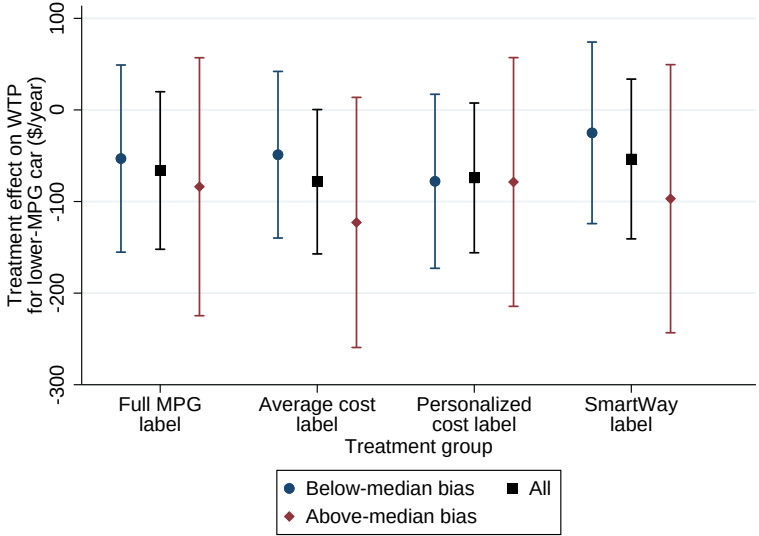
But are not well-targeted



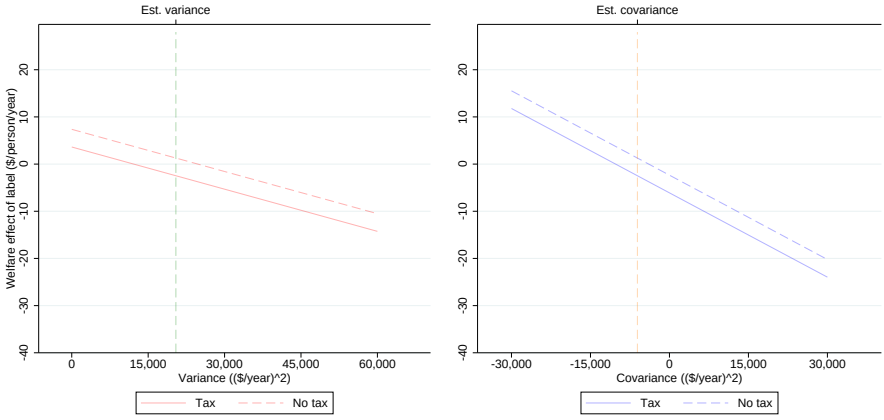
Welfare effects



Fuel economy labels



Fule economy labels: Impact of $Var[\tau]$ and $Cov[\gamma, \tau]$ on welfare



Measuring direct utility effects of NPIs

Measuring direct utility effects

Common approach: avoidance design

- Measure willingness-to-pay to avoid or receive

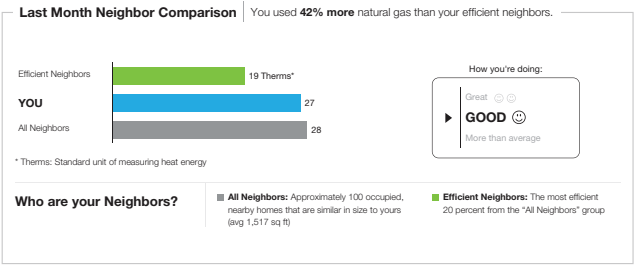
Examples:

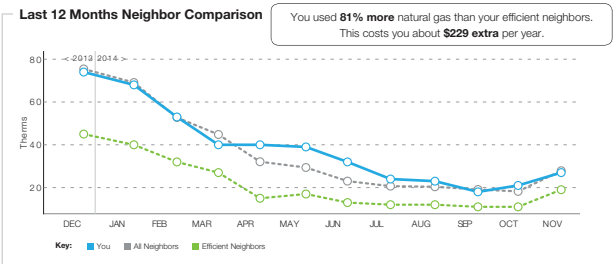
- DellaVigna, List, and Malmendier (2012), Trachtman et al. (2015), Andreoni, Rao, and Trachman (2017): avoid being asked to donate to charity
- Allcott and Kessler (2019): avoid (or receive) Home Energy Reports
- Butera et al. (2022): avoid (or receive) social recognition for exercise or charitable donation

Potential issue: Non-comparability problem (Bernheim, 2016; Bernheim and Taubinsky 2018)

- E.g., if I donate out of guilt, then I may not avoid the opportunity out of guilt as well, so avoidance decisions do not accurately "price out" guilt

Allcott and Kessler (2019): Home Energy Reports





Mail survey

People. Power. Possibilities.
Central Hudson
A FORTIS COMPANY

Account Number: xxxx-xxxx-xx-x

Tell us what you think — and earn a check for up to $10!

Central Hudson has been sending you Home Energy Reports since last fall, and we want to know what you think about them. Would you take a moment to complete the survey below? For each question, please fill in one box with your answer.

What happens next?

1. When you're finished, mail the survey back to us in the enclosed prepaid envelope.
2. We will use a lottery to draw one of the first seven questions, and we'll mail you what you chose in that question — either a check or a check plus four more Home Energy Reports.

Thank you!

Your participation will help us make these reports even more useful for you. If you have any questions, please email us at **HERSurvey@cenhud.com** or call **(845) 486-5221**.

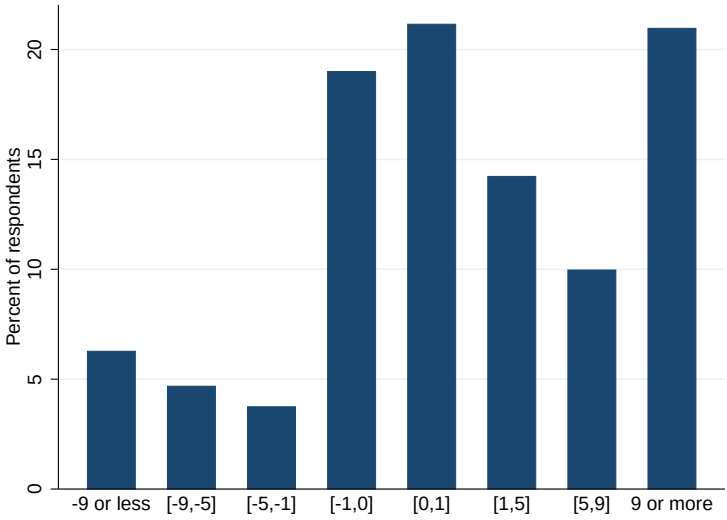
1.	Which would you prefer?	+ $10	4 more Home Energy Reports PLUS a $10 check	☐ OR ☐	$1 A $1 check
2.	Which would you prefer?	+ $10	4 more Home Energy Reports PLUS a $10 check	☐ OR ☐	$5 A $5 check
3.	Which would you prefer?	+ $10	4 more Home Energy Reports PLUS a $10 check	☐ OR ☐	$9 A $9 check
4.	Which would you prefer?	+ $10	4 more Home Energy Reports PLUS a $10 check	☐ OR ☐	$10 A $10 check
5.	Which would you prefer?	+ $9	4 more Home Energy Reports PLUS a $9 check	☐ OR ☐	$10 A $10 check
6.	Which would you prefer?	+ $5	4 more Home Energy Reports PLUS a $5 check	☐ OR ☐	$10 A $10 check
7.	Which would you prefer?	+ $1	4 more Home Energy Reports PLUS a $1 check	☐ OR ☐	$10 A $10 check

8. Think back to when you received your first Home Energy Report. Did you find that you used more or less energy than you thought?

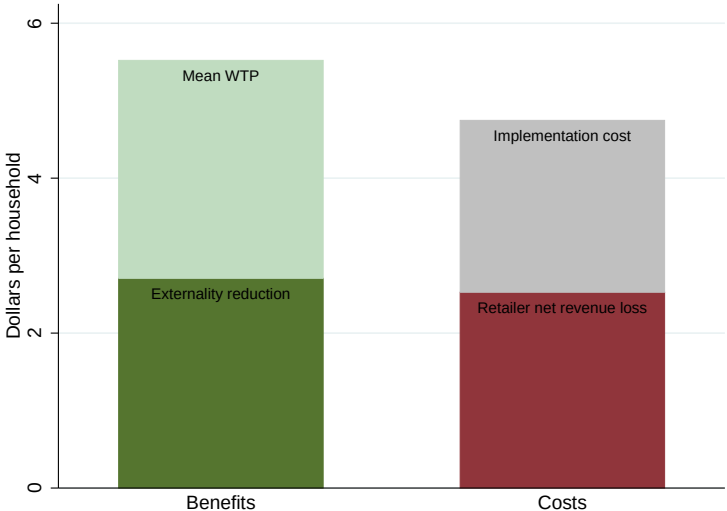
☐ Much less ☐ Somewhat less ☐ About what I thought ☐ Somewhat more ☐ Much more

CHSE_0309_WELCOME_LETTER_SURVEYA

Willingness-to-Pay



Social welfare analysis: Graphical



Measuring the welfare effects of social image

Butera, Metcalfe, Morrison, Taubinsky (2022)

- Field experiment promoting YMCA attendance
- Online experiments on charitable giving

YMCA public recognition treatment

Thank you for joining Grow & Thrive from your friends at YMCA!		
	# of visits	Dollars Raised
1. John Doe	25	$50
2. Mary Adams	24	$48
..		
49. Jack Black	10	$20
..		

Monetizing the public recognition frame

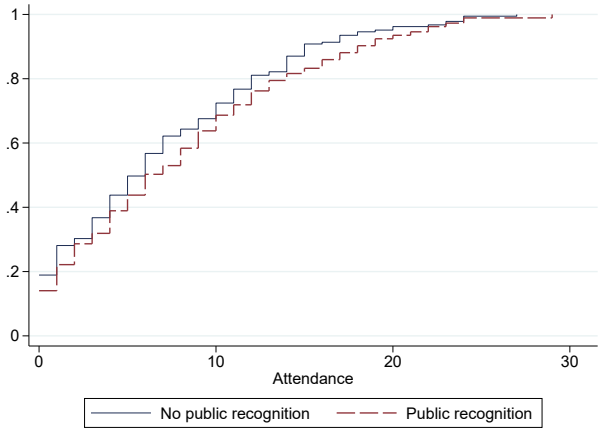
Used incentive-compatible bidding mechanism to elicit WTP for increasing or decreasing chance to be randomized into public recognition by 10%

Elicit WTP for PR for 11 different attendances intervals, spanning 0-30 attendances

- What is your WTP for PR if you attend 0 times?
- What is your WTP for PR if you attend 1 time?
- ....

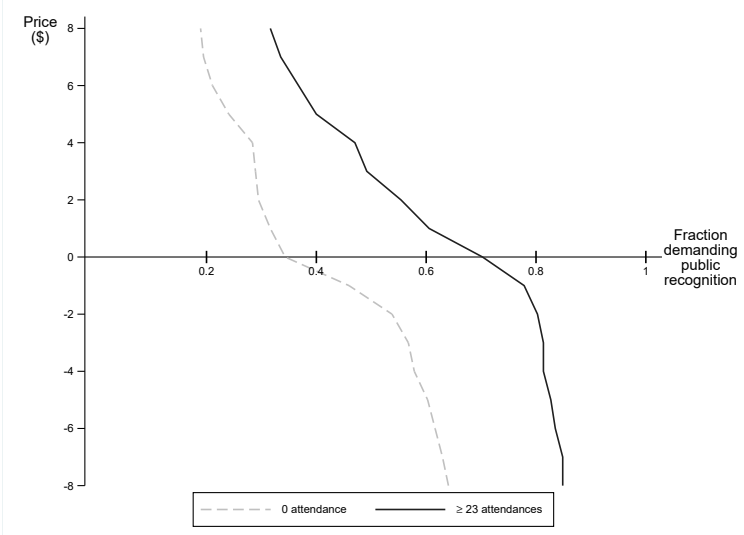
(Note: participants given past attendance of YOTA members beforehand)

Effects on attendance



+1.19 attendances (s.e. 0.46), off of a control group mean of 6.91

Demand curves



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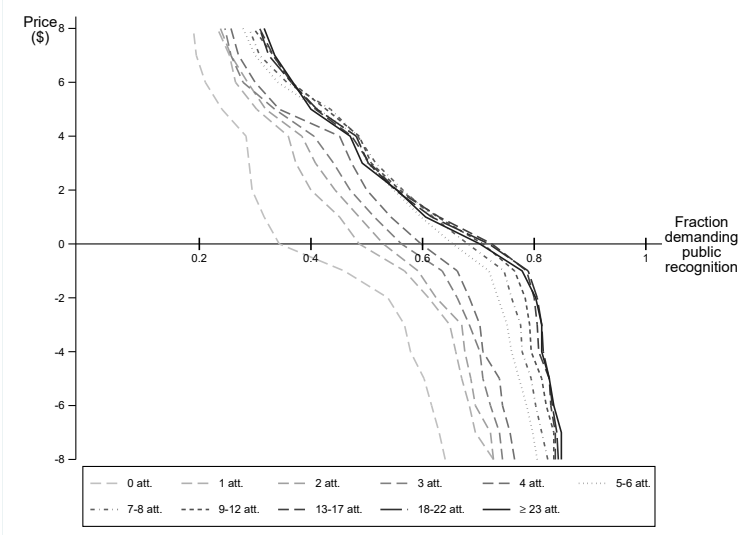
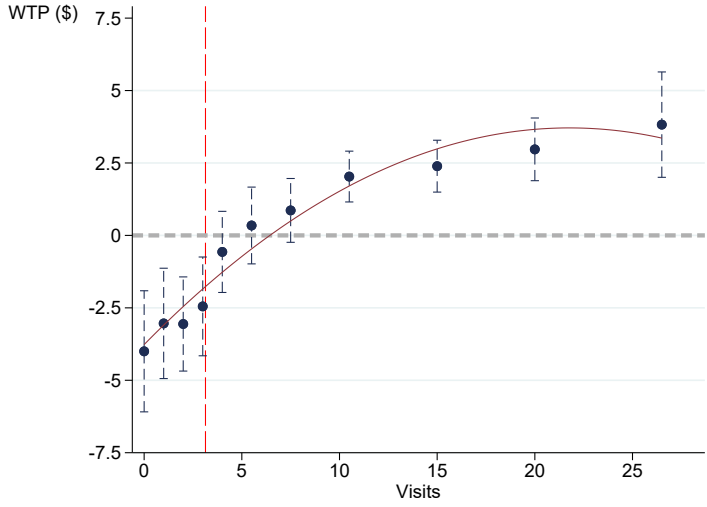


How do image payoffs vary with performance?



Takeaways

- NPIs are popular because of colloquialisms that suggest that they are “cheap” and “innocuous”
- But this is illusory
  1. NPIs can have direct effects on utility, sometimes very aversive
  2. Change consumer prices when pass-through $\rho \neq 1$
  3. May be inefficient relative to taxation if they are not well-targeted, even if ATE is “in the right direction”
- Standard tools of economics—careful modeling and measurement—can deliver answers that are very different from those suggested by a-theoretical “behavioral science” approaches

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- Standard tools of economics—careful modeling and measurement—can deliver answers that are very different from those suggested by a-theoretical “behavioral science” approaches
- Given the 100s of “nudge” papers studying ATEs, there are tremendous opportunities for papers studying *welfare*